PROMOTING SLEEP IN HOSPITALIZED CLIENTS USING RELAXATION TECHNIQUES

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CHAPTER 1

INTRODUCTION

One challenge facing today's nurse is promoting healthy life styles for clients. The task of promoting health becomes even more difficult when the nurse is working with the already compromised, hospitalized client. The health status of a client can be visualized on a continuum with terminal points labeled "health" and "illness".

One of the functions of nursing is to assist the client to move towards the "health" end of the continuum. A naturally occurring, health-promoting function of human beings is sleep. Sleep is said to be a primarily regenerative process; one that integrates information and data received and prepares the sleeper for further data collection and activity (Gaarder, 1966). Because a client is exposed to many stresses during hospitalization, he may have difficulty sleeping (Long, 1969). Frequently, in order to assist the patient to sleep, the physician will prescribe sleep inducing medication for the hospitalized individual (Mendelson, 1980). Hartmann (1978) observed, however, that this seemingly innocuous use of sleep inducing medications

is inappropriate when the potential risks to the client are evaluated.

The nurse, recognizing the need for sleep on the part of the client and possible ill effects of medications used to induce sleep, may wonder if there is some non-pharmacologic means of promoting sleep in hospitalized clients. By promoting quality sleep, the nurse is better able to assist the patient in his movement towards "health" on the health-illness continuum.

Problem of Study

The problem of this investigation was as follows:

Is there a difference in the number of doses of "pro re nata" (PRN) medications taken and the perception of the quality of sleep among four groups of hospitalized clients:

a. Verbal and tactile relaxation treatment group

b. Verbal relaxation treatment group

c. Tactile relaxation treatment group

d. No relaxation treatment group

If a difference is demonstrated among the four groups, which groups differ significantly from each other?

Justification of Problem

Sleep is necessary to human health and survival. Gaarder (1966), when developing a conceptual model for sleep, stated that sleep has two functions: (a) the "destructuralization" of the myriad of information that is assimilated by the brain each day, but does not need to be stored in an easily retrievable form and (b) organization, by the individual, of some of the data received during the day into adaptive structural changes.

Alterations in normal sleep patterns, or failure to meet increased sleep demands, such as those induced by illness, may result in a condition known as sleep deprivation. In sleep deprived individuals, a gamut of physiological and psychological symptoms may occur, ranging from simple fatigue and irritability to reversible psychosis (Mendelson, 1980). Some clients may not suffer from sleep deprivation, but may instead suffer from insomnia, the inability to fall asleep or stay asleep.

Hospitalized clients, because of the numerous physiologic and psychologic stresses to which they are exposed are likely candidates to suffer sleep impairment. Long (1969) stated: "patients in hospitals, away from their usual sleep environments and beset by the problems created by illness, frequently have difficulty meeting one of their

most basic physiologic needs--the need for sleep--at a time when they require it most" (p. 1896).

As a result of the hospitalized clients' increased susceptibility to insomnia, sleep inducing medications are frequently prescribed. The widespread use of sleep inducing drugs is not without risk, however. Complications of treatment with sleep inducing medications include dependency, interactions with other drugs and ethanol, impaired daytime functions, and illegal or inappropriate use of the drug by others (Hartmann, 1978; Mendelson, 1980). Hartmann (1978) stated: "I believe that the risks of sleeping pills, as sleeping pills have actually been used over the past few decades, outweigh the benefits" (p.152).

Nursing, as a profession, desires to promote maximum wellness in the clients that it serves. There has been an increased emphasis on the use of holistic techniques such as therapeutic touch, relaxation exercises and biofeedback in clinical nursing practice. Early in their nursing education, nurses are taught that giving a back rub to a patient promotes both relaxation and sleep. In daily practice, however, back rubs and other comfort promoting, relaxing patient interventions, formerly part of "P.M. care" are frequently overlooked.

In this study, the relationship of the quality of sleep

and the number of sleeping medications taken to several non-pharmacologic relaxation techniques including back rubs was examined. A significant relationship between the use of relaxation techniques, an increase in the quality of sleep, and a decrease in the number of sleeping medication doses taken would provide nursing with one potentially useful intervention for sleep promotion. One study cannot adequately demonstrate the effectiveness of a nursing intervention. Perhaps, after reviewing this study, nurses will consider the inclusion of non-pharmacologic sleep inducing techniques in their practice with clients.

Conceptual Framework

Using a conceptual framework in a research study helps give the investigator direction to the search. The information gathered in this study will be examined in light of the concepts in Betty Neuman's Health Care Systems Model and Gaarder's conceptual model of sleep.

Neuman (1982) stated: "Man is an interacting open system in his total interface with his environment and is at all times either in a dynamic state of wellness or ill health in varying degrees. (p. 9). She has labeled the boundary surrounding this open system, this usual state of wellness, the "normal line of defense". The normal line of defense protects each individual's core. The core and the

normal line of defense are made up of the physiological, psychological, sociocultural, and developmental characteristics of each person. The penetration of a stressor through the normal line of defense results in illness; stressor penetration through the core results in death. The degree of stressor penetration determines the degree of response by the individual. In general systems theory terminology, stressor penetration is an entropic force.

Because the core is so intrinsic to life, it is well protected by the organism. The layers of protection which occur between the normal lines of defense and the core, are called the "lines of resistance". These lines of resistance serve as system stabilizers. They are composed of learned and natural responses that assist the individual in establishing equilibrium after stressor penetration of the normal line of defense. In the Neuman model, a return to equilibrium or to the normal line of defense is referred to as "reconstitution". Reconstitution is analogous to the systems theory concept of negentropy.

The outermost layer of protection for the core is the client's flexible line of defense. The flexible line of defense is exterior to the normal line of defense. The flexible line varies from day-to-day and situation-to-

situation for each individual. Because the lines are so dynamic and respond readily to various client needs, they serve as an insulator between the environment and the normal line of defense. Unfortunately, as a negative result of their flexibility and dynamism, they are also extremely susceptible to modification by outside stimuli. These are the system protectors most frequently adversely affected when the individual is compromised in some way.

In the context of the Neuman model (Neuman & Young, 1972), the functions of the health care provider, specifically, the nurse, include:

a. Reduce the possibility of the individual's encounter with the stressor (primary prevention).
b. Strengthen the flexible line of defense to prevent stressor penetration (primary prevention).
c. Reduce the reaction to stressor penetration at the lines of resistance (secondary prevention).
d. Facilitate adaptation, reducing the possibility of repeated stressor penetration and assisting in the maintenance of a state of wellness (tertiary prevention).

The functions of sleep, identified by Gaarder (1966) as data destructuralization and organization may be said to constitute a portion of the individual's normal line of

defense, or state of wellness, as defined by Neuman. The flexible line of defense serves to protect or buffer the normal line of defense. The inability of an individual to sleep, or sleep effectively, therefore, can be a stressor penetrating the flexible line of defense. The resultant alterations in destructuralization and the organization of data secondary to sleep impairment may result in a penetration of the flexible line of defense, and may cause system instability. One function of the health care provider identified by Neuman and Young (1972) includes the strengthening of the flexible line of defense to prevent stressor penetration of the normal line of defense. The non-pharmacologic relaxation techniques used in this study were designed to facilitate sleep, therefore, strengthening the hospitalized client's flexible line of defense.

The subjects included in the study each possessed an intact core, but had suffered some penetration through their normal lines of defense, resulting in a state of illness. The experience of hospitalization, itself, is another potential stressor. Penetration of the normal lines of defense by the stressor hospitalization may result in impaired sleep.

Individuals with intact normal lines of defense are able to sleep restfully and painlessly without the routine

use of sleep producing pharmacologic agents. Some measures used to strengthen the flexible lines of defense and to promote sleep include: "counting sheep", taking a warm bath, or drinking warm milk. A common intervention used in the hospitalized client to strengthen the normal line of defense is the administration of a sleep inducing medication. The question arises as to whether interventions other than medications would be effective in strengthening the flexible lines of defense and promoting sleep in hospitalized clients. Relaxation techniques and back rubs have been used for many years by individual practicioners to promote sleep; the effectiveness of these techniques, however, has not been measured. The study was designed to determine if any relationship existed between relaxation techniques, including verbal techniques and back rubs, used to strengthen the flexible line of defense and a reduction in stressor penetration. The number of doses of sleep inducing medication taken and the client's perceived quality of sleep were measured and analyzed.

Assumptions

The following assumptions were made for the purposes of this study:

1. A stressor frequently encountered by hospitalized

clients is alteration of customary sleep patterns.

2. Continued alteration of sleep patterns may result in penetration of the normal line of defense.
3. PRN sleep inducing medications are administered at the request of the hospitalized client or following a nursing assessment of the client's individual needs.

Hypotheses

The hypotheses for this study were:

1. There is no significant difference in the number of doses of "pro re nata" medications taken by four groups of hospitalized clients:
   a. Verbal and tactile relaxation treatment group
   b. Verbal relaxation treatment group
   c. Tactile relaxation treatment group
   d. No relaxation treatment group
2. There is no significant difference in the perception of the quality of their sleep during the previous twelve hours by four groups of hospitalized clients:
   a. Verbal and tactile relaxation treatment group
   b. Verbal relaxation treatmentgroup
   c. Tactile relaxation treatment group

d. No relaxation treatment group

Definition of Terms

The following terms are defined for use in this study:

1. Number of pro re nata doses taken--The number of times a sleep inducing medication was taken by the subject during the 12 hours immediately following the intervention; this data was obtained from reviewing the medication administration record.

Example:

subject received Flurezapam 15 mg at 10 p.m.
Flurezapam 15 mg at 1 a.m.
Hydroxyine 50mg at 3 a.m.
Number of doses taken=three

Subject received Flurezapam, two 15 mg. capsules at 1 a.m.
Number of doses taken=one

2. Perception of quality of sleep--The numerical score assigned to a point made by the subject on the visual analogue scale of 1-10 rating the quality of his sleep on the night of the treatment.

3. Sleep inducing medications--Those drugs listed under the classification "central nervous system (CNS) drugs" and the sub-classifications "sedatives and hypnotics",

"analgesics", and "tranquilizers" in the American Hospital Formulary (1979).

4. Tactile relaxation techniques--Nursing interventions designed to assist clients in achieving a relaxed state after tactile treatment, ie. a back rub. The protocol for the back rub is found in appendix H.

5. Verbal relaxation techniques--Nursing interventions designed to assist clients in achieving a relaxed state after participation in verbal focusing/imaging and progressive muscular relaxation exercises. The specific protocols for these exercises are found in appendix F.

6. Verbal and tactile relaxation technique--A nursing intervention combining a back rub, verbal focusing, and imaging exercises. The protocol includes a combination of appendices F and H.

Limitations

This study had two major limitations. The first was unsatisfactory control of environmental stimuli which may adversely affect sleep. A hospital, by its very nature, is a noisy and unpredictable environment. It is not possible to control the volume or number of intercom pages, the movement of equipment through the hallways, the activities of the hospital staff, or that of other patients.

Therefore, it cannot be assured that all experimental treatments were administered under the same environmental conditions.

The second major limitation of the study related to sample selection. In order to most effectively determine if there is a relationship between the independent variable (relaxation techniques) and the dependent variables (client perception of quality of sleep and number of doses of sleep inducing medications taken), many subjects were excluded from the study in an effort to control extraneous or "nuisance" variance. While this subject exclusion does contribute to the elimination of confounding factors, it also severely limits the generalizability of the study to all hospitalized clients.

Summary

The problem of this study was to determine if any relationships exist between the use of non-pharmacologic relaxation techniques and the promotion of sleep in hospitalized individuals. Two measures were used to evaluate sleep: perception of quality of sleep and number of doses of PRN sleep inducing medications taken.

The conceptual framework of the study was Neuman's Health Care Systems Model (Neuman & Young, 1972; Neuman,

1982; Venable, 1980) and Gaarder's (1966) conceptual model of sleep. The nursing interventions studied were designed to strengthen the flexible line of defense to prevent stressor penetration of the normal line of defense.

CHAPTER 2

REVIEW OF THE LITERATURE

There are basically two methods used to promote sleep in hospitalized clients, pharmacologic (the use of sleep-inducing drugs) and non-pharmacologic or behavioral techniques. In order to best understand the appropriate use of non-pharmacologic sleep inducing methods in the clinical setting, the concepts of sleep, insomnia, relaxation, and touch must be explored. The amount of material written on each of these topics is prodigous, indeed. The review of the literature for this study is limited to those aspects of these broad content areas that apply directly to the study.

The Concept of Touch

To touch means, in its simplest sense, to have physical, tactile contact between oneself and another, or between oneself and an object. Examining touch at a greater depth, however, revealed that it is also a form of communication, and has great developmental significance, making it a particularly fitting area for nurses to study. Weiss (1979) stated, "Nurse's tactile interaction with patients is, perhaps, the most important to analyze and understand; for, as professionals, nurses represent a reservoir of

individuals who touch people throughout their life cycles" (p. 76).

Mechanisms of Touch

The sense of touch begins at the level of the skin. Here, the sensation of touch is perceived by receptors, which in turn transfer messages to the central nervous system (CNS). The neurophysiologic network related to touch has been described as the "haptic system" by Gibson (1966). The haptic system consists of mechanoreceptors located in free nerve endings, encapsulated nerve endings, and microscopic hair cells. They are located primarily in and just below the skin, but are also placed in connective tissue, around blood vessels, and in the inner ear. In fact, the only portion of the body that does not contain some mechanoreceptors is the brain, itself (Gibson, 1966). The messages from the mechanoreceptors are transmitted to the central nervous system, where their messages are interpreted and acted upon. The response of the central nervous system to touch may vary from a simple reflexic reaction (withdrawal to pain) to categorization of the input for later use.

Developmental Aspects of Touch

Touch is viewed as a very basic, perhaps even the most

fundamental, form of communication (K. Barnett, 1972b; Goodykoontz, 1979; McCoy, 1977; Weiss, 1979). Montague (1971) stated that touch is the "mother of the senses", the "earliest to develop" (p. 1). As a means of communication, touch operates in both the physiologic and psychologic arenas.

Touch is such a powerful form of communication, with profound developmental, physiologic, and psychologic effects, that nurses must ask questions about the importance of touch in clinical practice. How does touch effect the development of the nurse-patient relationship? How do the developmental aspects of touch shape the client's need for nursing care?

British psychologists Mason and Pruitt (1980) reinforced the view of others, such as Montague, that touch is of the utmost importance in the early development of children. They indicated that as children approach adulthood, touch is relegated to a "minor supporting role", but that "Under some conditions, such as illness or stress, we may desire a temporary return to the basic needs of of our early days" (p. 1000). Under these circumstances, he stated "touch may also be used to communicate acceptance of the whole individual at a time when that person feels less than whole and indeed somewhat imperfect or spoiled, and

therefore, in his view, unacceptable to others" (p. 1001). Dominian (1971), a London psychiatrist, explained the need for touch in the acutely ill:

> In technical terms there is an emotional regression to an earlier phase and many sick people react to their environment with the anxiety and fear of lost, frightened, and hurt youngsters. They do their best to hide these feelings which they consider inappropriate, but whenever the opportunity is given they hold on to a hand or arm with the same tenacious clinging turmoil as the frightened child. It is just as important for all doctors and nurses to learn to use their hands in this way as to perform the most delicate medical, surgical, or nursing procedure. (p.897)

Burton and Heller (1964) stated that repeated stimulation of elements of the haptic system, by touch, from birth, form the basis of all future learning. Montague (1971) identified other physiologic and developmental advantages that result from cutaneous stimulation of the skin of mammals:

> It is evident that in mammals generally, cutaneous stimulation is important at all stages of development, but particularly important during the early days of the life of the newborn. . .Indeed, the more we learn about the effects of cutaneous stimulation, the more pervasively significant for health development do we find it to be. For example, in one of the most recent studies reported, it was found that early infantile cutaneous stimulation exerts a highly beneficial influence upon the immunological system, having important consequences for resistance to infectious and other diseases. The study indicated that rats who had been handled in infancy showed a higher serum antibody titre (standard) in every case. . .Thus, the immunological responsivity of the adult appears to

> be significantly modified by an early cutaneous experience. . .Handling of animals in their early days results in significantly greater increases in weight, more activity, less fearfulness, greater ability to withstand stress, and greater resistance to physiological damage. . . . Cutanous stimulation in the various forms in which the young receive it is of prime importance for their healthy physical and behavioral development. (p.23-25)

Nurse scientists and scholars, recognizing the developmental significance of touch, and its use as a powerful communication tool with clients, are currently analyzing the concept of touch and its effects on client populations.

Use of Touch in Nursing Practice

Weiss (1979) described six qualities or "tactile symbols" of touch. These symbols include duration, location, action, intensity, frequency, and sensation. She proposed that these tactile symbols be used for discussion of the phenomena of touch by nurse scientists, and others. Nurses are encouraged to examine the use of touch in their own practice using these qualitative descriptors. Each of these tactile symbols can describe an adaptive or maladaptive application of touch.

Weiss (1979) labeled the reception of messages from the mechanoreceptors in the central nervous system tactile integration, a state of tactile arousal. She developed a model illustrating the relationships between tactile

deprivation, tactile integration, and tactile satiation with adaptation and maladaptation. She viewed deprivation, integration, and satiation on a continuum. Tactile integration is the only area of the continuum from which adaptation arises. Tactile deprivation and satiation both lead to maladaptive processes.

K. Barnett (1972b) developed a theoretical construct of touch as related to nursing. K. Barnett stated that "the first and most fundamental means of communicating is through some form of touch, which may be the only means of communication, or it may be a basis for meaningful verbal exchange" (p. 102). K. Barnett organized the concept of touch in five groups:

1. Mechanics of communication
2. Touch as a means of communicating
3. Touch as a basis for establishing communication.
4. Touch as a means for communicating emotions
5. Touch as a means for communicating ideas

She stated that these categories are the "abstract universals of touch communication in the American culture" (p. 108).

K. Barnett proposed that hospitalized patients who feel a sense of isolation, depersonalization, altered body image, regression, anxiety, or dependency are in far greater need

of touch than other groups of patients. Yet, relatively few studies of the effect of touch on hospitalized medical-surgical patients have been published.

Several investigators have examined the frequency and the effect of touch in the acute care setting. K. Barnett (1972a) observed the frequency of non-necessary touch by health care professionals and noted that registered nurses were the most likely health care practitioners to touch clients. She also observed that as the age of the health care worker increased, the workers were less likely to touch patients, and, that as the acuity of patient's illness increased, the patient was less likely to be touched.

Durr (1971) interviewed a small sample of medical-surgical patients with reference to their recollections of, and reactions to touch and closeness in the hospital. One patient responded "the nurse could be very close, but I'd feel a vastness between us. Touch closes the gap and gives confidence" (p.399). Other patients identified touch as the only helpful factor in relieving fear and anxiety. Durr concluded by that nurses should consider the importance of touch and closeness in their practice, and use them thoughtfully to facilitate patient comfort and well being.

Goodykoontz (1979) examined attitudes and practices of

nurses regarding touch. She differentiated between procedural and non-procedural touch, noting that most of the touching done in acute care settings by nurses is that of the procedural nature, that is, touching during the performance of specific nursing tasks. She reminded nurses that messages sent by touch, a powerful non-verbal communication tool, are significant and are not easy to change after transmission. A nurse who feels disgust, discomfort, or the desire to withdraw may communicate these feelings to the patient/client without any verbal exhange. Goodykoontz goes on to say, however, that thoughtful touch "facilitates positive nurse-client interactions. . . non-procedural touch may often be helpful to a patient's psychological or physcial well being" (p.17).

Some nursing studies have demonstrated positive effects of touch on patients in the acute care setting. McCorkle (1974) evaluated the effect of non-procedural touch on a group of 60 medical-surgical patients she classified as seriously ill. Her study demonstrated a positive correlation between touch and "positive acceptance responses." She concluded that touch may be useful for nurses in establishmening rapport with patients.

McCoy (1977) examined the response of patients in the Emergency Department to touch. Although the sample was

small (20 experimental subjects and 20 control subjects), she noted that 85% of the total positive responses to her questions about the nurse-patient relationship were given by members of the experimental group. Universal acceptance of the importance of touch in the therapeutic relationship has not occurred, however. Classic psychoanalytic practice demands that the client and therapist have no physical contact. Mintz (1969) wrote extensively on this issue and stated unequivocally that touch has an important place in the therapeutic relationship for the following reasons:

1. Touch is a natural part of a warm, on-going relationship.
2. Touch is a gratification of patient's infantile needs.
3. Touch is a gratification of patient's manipulative needs.
4. Touch is a means of eliciting feelings.

Burton and Heller (1964), on the other hand, stated that touch does not have a place in the therapeutic relationship except in rare circumstances, and only then a with clear understanding of the motives by both parties. Nursing authors do not express themselves as strongly on the negative aspects of touch, but do comment with reference to the risks of touch. K. Barnett (1972b) stated that touch

may be misinterpreted by the patient or by the nurse up to 50% of the time. Johnson (1965), after pointing out that reactions to touch are related to one's culture, one's age, and one's childhood experiences, cautioned the nurse to carefully consider "that when and how she touches a patient will, in all probability, affect whatever verbal structure she has set up within the relationship with the patient" (p. 59).

A traditional use of touch by nurses whose practice is based in the hospital has been the back rub. Temple (1967) stated: "Aside from the useful physical effects of the back rub, the act of giving it opens new channels of communication between patient and nurse as well as providing peaceful satisfaction for both" (p. 2103). Two distinct forms of back rubs are described in the literature. Michelson (1978) and Temple (1967) described three motions used in the "traditional" back rub. The effleurage movement is a stroking type of motion; the petrissage movement, a "kneading" motion; and tapotmement a "tapping" motion (frequently performed with the lateral surfaces of the hands). Longworth (1982) and Sister Regina Elizabeth (1966) described another type of back rub, the "slow stroke back massage" (SSBM). The SSBM consists of stroking the back, along the spine, in a cephalocaudal direction, at a rate of

approximately 60 strokes per minute. Slow stroke back massage is usually performed for less than 3 minutes. The effects of the traditional back rub or the SSBM on blood pressure, pulse, and respiratory rate have not been clearly demonstrated in the literature. Sister Regina Elizabeth (1966) stated that the SSBM stimulates the parasympathetic system. Kaufman (1964) found no significant physiologic changes in a hospitalized population of medical surgical clients who receieved SSBM. Barr and Taslitz (1970), however, noted mixed autonomic responses in their study group, which consisted of healthy volunteers receiving traditional back rubs.

The use of touch in clinical nursing practice varies with individual clinicians. It may be used as a form of communication, as an intervention designed to reduce anxiety in patients, or as a means of promoting relaxation. The physiologic effects of touch, specifically of back massage, have not yet been clearly identified. Because of its power, touch can be easily misinterpreted. Nurses must be aware of the ramifications and potential effects of touch prior to using it as a therapeutic intervention.

The Use of Touch by Other Health Care Professionals

Health professionals other than nurses and psycho-analysts have also studied touch in relation to their

practice. Huss (1977), an occupational therapist, noted that 60% of the colleagues observed stated that they were uncomfortable with the use of touch in their practice and further noted that occupational therapists, because of their background and training in the physiological and psychological sciences, should understand the importance of touch. Bogdanoff and Elbaum (1978), social workers, also remark on the relative lack of the use of touch in their professions. The bulk of health related literature on touch, however, has promoted its use with clients. New viewpoints on the concept of touch are constantly being explored.

Therapeutic Touch

Recently, another aspect of touch has been discussed in nursing literature. Krieger (1976, 1979b) identified, in the early seventies, the concept of therapeutic touch. She described therapeutic touch as the "uniquely human act of concern of one individual for another which is characterized by the touching of one by another; an act that incorporates an intent to help or heal the person so touched" (1976, p. 572). She later refined the concept, stating: "Therapeutic touch is the intelligent direction of significant life energies from the person playing the role of healer to the healee."(Krieger, 1979b, p. 230). Therapeutic touch is

closely akin to the "laying of hands", although Krieger does not attempt to relate any religious meaning to its effectiveness.

Krieger believed that there exists a life energy or "prana" (from the sanskrit) that serves as a unifying base for all life processes. She further supported the view of eastern mystics that healthy individuals possess an excess of prana, and that individuals who are ill have a deficit in prana. It is her contention that after centering (a specialized process of concentration or meditation), with the intent to heal, a healer can, with his hands, redistribute energies in the healee, transferring to him some of the healer's prana. This transfer of prana results in an increase in wellness, and the diminution or relief of symptoms.

Krieger maintained that the process of centering is of the utmost importance to the efficacy of therapeutic touch. Indeed, she quoted studies by Peper and Ancoli (cited in Krieger, 1979b p. 79) that demonstrate that Krieger's EEG activity changes during her healing attempts to a rapid beta state, reflecting intense concentration. In addition, the same researchers have noted the presence of EEG activity consistent with closed eye relaxed wakefulness in the open-eyed, awake, and alert subject.

Other studies of a physiologic nature have investigated the effects of touch. Krieger (1979a) demonstrated that the use of touch, with the intent to heal, in a group of clients was associated with a significant rise in hemoglobin values. Krieger compared the outcome of her study to Grad's (1961, 1964) earlier work which demonstrated an increase in the amount of chlorophyll in plants following intervention by a lay practitioner of therapeutic touch. The technique of Kirlian photography has been used to evaluate measurable change during the process of the application of therapeutic touch. Kirlian photography shows, graphically, changes in energy fields surrounding objects. Kirlian photographs of hands involved in the healing process do show differences from those photographs of hands that are "resting". The significance of these differences is, as yet, unclear (Sandroff, 1980). Heidt (1981) examined the use of therapeutic touch with hospitalized clients, and hypothesized that subjects who received therapeutic touch would achieve lower posttest A-state anxiety scores (defined in study) that subjects receiving casual touch intervention or no intervention at all. All hypotheses were supported.

A review of the literature with regard to touch and its place in nursing practice showed that touch has significant physiologic and psychologic meaning. It further

demonstrated that touch is a central human experience, but that its use in the clinical setting is subject to misinterpretation. Because of its diffuse nature, the effects of touch are difficult to measure. The few studies that have been published evaluating the effect of touch on the hospitalized medical-surgical client showed that touch can have positive effects. Recently, the concept of therapeutic or healing touch has been the subject of much discussion. Some research on this aspect of touch has been completed, and more is in progress. Ujhely (1979) summarized "we need to be conscious of the various modes of touching we engage in and use these judiciously so that they balance each other. In the last analysis, we have the right to touch others and to be touched by them in the measure to which our mutual encounter asks for" (p. 20).

The Concept of Relaxation

Relaxation is a intervention often prescribed by health care professionals and well meaning lay people. The term, however, is frequently used imprecisely. Sweeney (1978), recognizing the lack of an appropriate definition of relaxation for use by nurse researchers, suggested the following conceptual definition:

> A positively perceived state or response by an individual in attaining relative freedom from tension, toil or strain. It may be psychological

> or physiological in origin. It is psychological in control. It is an active and conscious process and can be influenced by both internal and external stimuli. It is manifested by both psychological and physiological behavioral responses. (p. 242)

Benson, Beary, and Carol (1974) described the state of relaxation as a "wakeful hypometabolic state". This state is characterized by the following physiologic alterations: altered state of consciousness, decreased oxygen consumption, decreased carbon dioxide excretion, decreased pulse, decreased respiratory rate, and decreased arterial blood lactate concentrate. The presence of these pheonomena in an individual has been labeled the "relaxation response". Benson hypothesized that the relaxation response is actually an integrated hypothalmic response demonstrated by decreased sympathetic nervous system activity, and that the relaxation response serves as a counterbalance to the sympathetic component of the autonomic nervous system.

Selye (1976) observed that the same parameters that show a decrease during the relaxation response are increased when an individual is under stress. Selye stated that the physiologic changes that occur during stress, the "alarm phase" of the general adaptation syndrome, may occur because of increased secretions by the adrenal cortex and pituitary glands, with effects on the cardiovascular and central nervous system as well as the autonomic nervous system.

Selye indicated that elicitation of the relaxation response

> help(s) to cut out all exacting mental or physical activity which might demand adaptation to change or other types of performance that require attention. Although the biologic mechanism of all these practices remains to be clarified, they do manifestly offer much needed-relaxation to many people and can be even more efficient in this respect than deep sleep. (p. 422)

Benson, Kotch, Crassweller and Greenwood (1977) stated that the decreased autonomic activity associated with the relaxation response is a result of decreased muscle tonus.

Several modalities have been identified as being useful in the elicitation of the relaxation response. Among them are transcendental meditation, contemplative (religious) meditation, repetition of a sound or "mantra" (analagous to western forms of repetitous prayer such as the rosary or a litany), hypnosis, autogenic training, yoga, zen, and progressive muscle relaxation. Excessive elicitation of the relaxation response is not without risk, however. Benson, Greenwood, and Klemchuk (1975) commented:

> When the relaxation response is frequently elicited, for example, for many hours daily over a period of several days, some individuals have experienced a withdrawal from life and symptoms from insomnia to hallucinatory behavior. It is difficult to evaluate these effects of excessive elicitation of the relaxation response in retrospect. Individuals with pre-existing emotional problems may be drawn to the technique which evangelistically promises relief from tension and stress". (p. 95)

Borkovek and Sides (1979), in analyzing 25 studies for methods of teaching relaxation to subjects, concluded that subjects who are involved in abbreviated progressive muscular relaxation training sessions demonstrated fewer changes associated with the relaxation response than did subjects who participated in the more lengthy, more involved sessions. Greenwood and Benson (1977) contrasted the use of classic progressive muscular relaxation training (Jacobson, 1938) and the use of a relaxation training method developed by Beary, Benson, and Klemchuk (1974). The essential elements of the Beary et al. method were: 1) a mental device designed to minimize one's attention to external stimuli; 2) a passive attitude; 3)decreased muscle tonus and 4) a quiet environment. Subjects who were taught the Beary et al. technique exhibited a decrease in oxygen consumption, carbon dioxide excretion, and respiratory rate. Greenwood and Benson commented (1977):

> The data strongly suggest that abbreviated training in progressive relaxation does not result in decreased autonomic nervous system activity....the use of the relaxation response may be a more appropriate method than abbreviated training in progressive relaxation. (p. 342)

Marshall and Strawbridge (1972), however,in a study contrasting four treatments-- 1)progressive relaxation; 2)concentration on feelings of calmness; relaxation and

comfort while imagining a pleasant scene; 3) combination of 1 and 2; and 4) a control group--demonstrated a statistically significant increase in relaxation in all the treatment groups without any difference among groups. Evans (1976) combined several relaxation techniques into what he labeled "eclectic relaxation therapy". This technique, which incorporates principles from autogenic training, progressive muscular relaxation, neo-reichian, gestalt and learning theories, is also called differential relaxation. Evans (1976) observed "Eclectic relaxation therapy obtains same, if not more extensive and profound effects as established relaxation methods, and is used in a shorter and less laborious manner" (p. 150).

Several studies have also been conducted utilizing relaxation techniques as an alternate or adjunct clinical therapy for specified situations including hypertension, feelings of wellness,and pain control. Peters, Benson, and Porter (1977) reported on self measures of health in a sample of office workers, some of whom participated in a relaxation response group, some of whom participated in "quiet breaks" group, and a control group. Somatic symptoms and performance increased after only a few sessions of relaxation training, sociability/satisfaction scores increased later. There was no significant change noted in

scores on the "happiness index".

Richter and Sloan (1979) recommended relaxation training as a "nursing prescription when stress interferes with the ability to function" (p. 1960). She asserted that the four elements necessary to elicit the relaxation response are a quiet environment, a passive attitude, a comfortable position, and an object on which to dwell. Harrell and Coles (1977) also asserted that an object or idea to "dwell on" is the most important component of progressive relaxation exercises. Taylor, Faquhar, Nelson, and Agra (1977) contrasted the changes in blood pressure in three groups: the first group received general instructions to "relax", but no specific techniques were demonstrated or discussed; for the second group, non-specific therapeutic "talk sessions" were conducted with the clients; and in the third group, clients were given instructions and guidance in specific relaxation techniques. The greatest reduction in blood pressure was noted in the group of subjects who received specific instructions in relaxation techniques.

Flaherty and Fitzpatrick (1978) studied the effect of relaxation exercises on post operative pain. The investigators instructed a group of post-operative patients in a relaxation technique involving relaxation of the lower jaw. The subjects in the experimental group used fewer

analgesics during the immediate post-operative period than did the subjects in the control group. Measurements of vital sign differences between the two groups, however, was statistically insignificant.

Wells (1982) evaluated muscle tension and self-reports of pain and distress in 12 cholecystectomy patients, 6 of whom had received preoperative relaxation training. The subjects who had received the relaxation training reported less pain and distress, but no change in abdominal muscle tension was noted in this group. Wells also noted that there was no significant difference in the amount of pain medication taken by either group.

Tamez, Moore, and Brown (1978) hypothesized that the use of relaxation training excercises would decrease PRN usage of anti-anxiety and anti-psychotic drugs in a hospital psychiatric setting. The decrease in number of doses of PRN medication doses taken was so small, however, that no conclusions regarding the relationship of the training to the number of doses of PRN medication take could be made.

Autogenic training is one form of relaxation training developed 50 years ago in Germany. It "involves the linking of a few verbal formulae with corresponding mental images to trigger the body's automatic self-regulatory tendencies to maintain peace, harmony and homeostasis" (Blattner, 1981, p.

236) The verbal formulae consist of such statements as "my right arm is heavy" and "my breathing is calm and regular".

Another type of relaxation training, developed by Jacobson (1938, 1977) at the University of Chicago in the twenties and thirties is "progressive muscular relaxation". Progressive muscular relaxation consists of a lengthy course of instruction involving the alternate tensing and relaxation of certain sets of muscles. It is similar to some of the muscle relaxation techniques taught to women during Lamaze childbirth preparation classes (Blattner, 1981; Jacobson, 1938; Dick-Read, 1955).

Shapiro and Lehrer (1980) compared progressive muscular relaxation and autogenic relaxation training. Following five sessions of either progressive muscular relaxation or autogenic training, both groups of subjects significantly reduced their scores on scales measuring anxiety, depression, and frequency and intensity of symptoms.

Adler and Lehrer (1978) following their observation that physiologic measures of relaxation remained largely unchanged in groups receiving autogenic training and progressive muscular relaxation instruction, noted that "Relaxation instruction appears to have a more pronounced effect on self-report measures than on physiological ones. Possible reasons for this finding include the following:

direct cognitive effects of the relaxation procedure, cognitive dissonance, and demand characteristics" (p. 192).

Reinking and Kohl (1975) also contrasted several forms of relaxation training--EMG feedback (biofeedback), progressive muscular relaxation, a combination of both, and a monetary reward system. All groups reported increased relaxation, with the group receiving both the EMG feedback and the progressive muscular relaxation training reporting the greatest increase. Borkovec, Grayson, and Cooper's (1978), work also supported that relaxation occurred in groups receiving either progressive muscular relaxation instruction or autogenic training, but that no difference was noted between the groups.

Connor (1974) took a somewhat different approach, measuring verbal report of anxiety, autonomic response immediately following short term training, and autonomic response to an anxiety producing cue. The subjects did not show a significant change in either verbal anxiety reports or autonomic effects immediately post training. The subjects did, however, show a decreased autonomic response to the anxiety producing cue following the training.

The relaxation state, or relaxation response has been described as a wakeful hypometabolic state. Many techniques have been designed to induce the relaxation response in

patients and clients. Frequently used relaxation techniques include autogenic training, progressive muscular relaxation, biofeedback, and hypnosis. Studies have consistently demonstrated, however, that the elicitation of the relaxation response is not related to the use of one specific relaxation technique over another, but rather to the use of a structured relaxation technique or exercise over no relaxation intervention at all.

The Phenomena of Sleep

Research on sleep has concentrated primarily on what is happening to the organism during sleep, and how these organic events can be altered. A rather small portion of the sleep literature is devoted to the "why", the function of sleep, as opposed to its mechanisms. Prior to discussing current thought on the function of sleep, it is appropriate to review briefly, what is known about physiologic mechanisms of sleep.

Physiologic Mechanisms of Sleep

Scientists who study sleep have divided the stages of sleep and wakefulness into five easily identified phases on EEG recordings (Blanchard & Epstein, 1978; Morgan, 1965). These phases are the excited (awake, thinking), relaxed, drowsy, sleep, and deep sleep stages. The EEG of the fully

awake (excited) individual is characterized by intense high frequency, moderate-to-high amplitude (beta) brain wave activity. The relaxed stage is reflected on the EEG as a series of synchronized "alpha" waves occurring at a rate of approximately 10 per second. As an individual becomes drowsy, the alpha waves give way to less regular waves of lower amplitude, the theta waves. As the individual drifts into light sleep, bursts of activity, known as "spindles" are superimposed on the theta and the slower delta waves. Sleep researchers generally concede that when the spindles occur, the individual being observed is asleep. As the sleep becomes deeper, the spindles disappear, and the delta waves become larger and less frequent.

During the early fifties, graduate students observing individuals in a sleep laboratory at Stanford University noted periodic episodes of rapid conjugate eye movement, accompanied by EEG patterns associated with wakefulness (alpha activity), during periods of deep sleep (Aserinsky & Kleitman, 1953, 1955). Dement, Aserinsky's professor, labeled this phenomena rapid eye movement or REM sleep (Dement, 1973). Dement studied this phenomena by waking sleep laboratory subjects during REM sleep and concluded that REM is highly correlated with dreaming in the sleeping individual (Dement & Kleitman, 1957; Foulkes, 1962).

Hayter (1980) has described the sleep of an individual with reference to these four phases. The first phase, that of the lightest sleep, lasts only a few minutes. If awakened during this phase, an individual may deny that he has been asleep at all. The EEG characteristics of this phase are similar, although not identical to, the EEG patterns of one who is awake (Hine, 1972). Phase one is followed by phases two, three and four, progressively deeper levels of sleep. Stage four is that stage of deep sleep from which it is very difficult to arouse an individual. After progressing through these four phases, taking about 90 minutes, the sleeping individual moves into REM sleep. If awakened during this time, he frequently will be able to vividly recount the content of his dreams. The periods of REM sleep can vary from a few minutes to approximately 30 minutes.

Infants and children spend greater portions of their sleep in a REM state than do young adults; young adults spend a greater portion of their sleep time in REM than do the elderly (Sterman, 1979). Additionally, Feinberg and Evarts (1969) noted that the portion of sleep that is REM is decreased in mentally retarded individuals and in patients with chronic brain syndrome when compared to their respective age groups.

At the completion of the REM phase of sleep, the

individual will return to Stage II of the sleep cycle, and progress through stages III and IV before returning to the REM phase. The total duration of the sleep cycle is approximately 90 minutes in most adults, and will be repeated 4-6 times during the course of a night's sleep.

Sleep researchers divide sleep into two functional types, REM and non REM (NREM). A great deal of discussion is devoted to what occurs during these categories of sleep, why two distinct types exist, and the function of the two types, as well as that of sleep, itself. REM sleep may be called desynchronized sleep, paradoxical sleep, dream sleep, restorative sleep, low voltage fast wave sleep, and activated sleep in the literture. Non REM sleep known as synchronized sleep, slow wave sleep, preparatory sleep, and delta wave sleep.

Theories on Functions of Sleep

Theories on the function of sleep can be divided into three groups for ease of study: physiologic theories, learning/information processing theories, and psychophysiologic theories which combine the aspects of both groups. Webb (1979) has gone even further and delineated five categories of theories on the function of sleep: restorative, protective, energy conservation, ethological (adaptive), and instinctive. The two taxonomic systems can

be combined as follows for discussion:

I. Physiologic theories of the function of sleep
    1. Restorative
    2. Protective
    3. Energy Conservation
II. Psychophysiologic Theories
    1. Instinctive
    2. Ethological (adaptive)
III. Information Processing/Learning Theories

The purely physiologic theories will be discussed first. As one may expect, several theorists have synthesized aspects of the different categories into their individual theories; but nevertheless, they support essentially one theory or position.

Restorative functions of sleep. Common answers from a layperson to the questions "Why do you sleep?" may be "It gives me strength"; "It helps my body to rebuild"; or "It relieves my tiredness". These statements express an essentially restorative view of the function of sleep.

Webb (1975) stated that the basic premise of the restorative position is "Sleep is a period of recovery or restoration of physiological, neurological and/or psychological states" (p. 160). Hess (cited in Koella,

1972) viewed sleep as an active process designed primarily to promote restitution in the organism, particularly restitution of the central nervous system. Hess hypothesized, as early as 1925, that the brain stem modulated cerebral cortical activity during sleep. This hypothesis has been supported in the studies of Moruzzi (1966).

Freeman (1970) suggested that sleep functions to provide for cerebral neuronal renewal. He further suggested that two separate sub-systems exist in the brain. One monitors the environment, arousing the individual only for dangerous or unusual stimuli, while the other sub-system promotes neuronal renewal. When renewal is completed by one sub-system, the two sub-systems switch roles. He related the two sub-systems with REM and NREM sleep, stating that higher level cortical neurons are renewed during REM, while the NREM sub-system provides environmental surveillance. The lower brain functions are renewed during NREM while the sub-system associated with REM provides the environmental monitor. Oswald (1970) stated that certain types of restoration are associated with REM and NREM sleep. It is his view that the body, exclusive of the brain, is renewed and restored during NREM sleep, while the brain itself, is renewed and restored during REM sleep.

Protective theories of the function of sleep. These theories are few in number. The researcher who elucidated most clearly the protective function of sleep was Pavlov (1927). He viewed the function of sleep as inhibition of cortical neurons. He observed that the cortical neurons must be inhibited to prevent them from "overloading" or becoming exhausted. He saw sleep as a state of progressive cortical inhibition. Monnier (1973) stated that sleep functions as a modulator of attention, perception, and cortical activity. He noted that the modulation is necessary to protect waking functions. Monnier observed: "Wakefulness is a function to be considered as primary, sleep as a control organization with inhibitory mechanisms" (cited in Koella, 1973, p. 229).

Energy conservation theories of the function of sleep. The energy conservation theories are rather infrequently found in the literature. Oswald (1973) observed that the periods of sleep and wakefulness are correlated with anabolic and catabolic activity. He stated "Sleep alternates with wakefulness and permits economy in metabolic systems" (p. 226). He further noted that wakefulness is associated with catabolic processes, and that sleep is frequently associated with anabolic activity.

Other proponents of an energy conservation approach to the function of sleep are Berger and Oswald (1965). He observed that the active processes of homeostasis greatly increase the organism's energy demands, and that periods of dormancy or sleep are required to prevent energy depletion. Zepelin and Rechtshaffen (1974), when observing 53 separate species of mammals, concluded "Sleep has the function of enforcing rest and limiting metabolic requirements" (p. 425).

Instinctual functions of sleep. Instinct is defined as "The innate aspect of behavior that is unlearned, complex, and normally adaptive" (Morris, 1969, p. 680). Parmeggiani (1972) espoused the view that the function of sleep evolved from an instinctive process. He identified certain behaviors associated with sleep as having ancient protective importance. For example, the mammal "curls up" for sleep in an thermoregulatory effort. Parmaggiani stated that one of the determinants of an instinctive behavior is what is termed a "consummatory act". The instinctual efforts of a species are directed towards fulfilling this need. Parmaggiani further stated that the primary goal of sleep is homeostasis; that homeostasis is the consummatory act to which all sleep behavior is directed. He further noted that unidentified internal processes that are homeostatic in

nature occur during desynchronized sleep.

Moruzzi (1966) also integrate some instinctual theory into his view on sleep. He, too, hypothesizes that sleep has evolved in each organism to preserve homeostatic and restorative processes. Moruzzi further stated that the instinctual drive for sleep is far more significant in each species than any specific physiologic or neurochemical need.

Meddis (1975), in observing the sleep behavior of animals, also stated that sleep is strongly instinctual. In a situation where an animal is constantly threatened by predators, sleep can contribute to his survival by permitting him to be immobile (and, therefore less noticeable) as well as permitting him to regain strength for his waking activities. Meddis noted that sleep patterns vary widely species-to-species, and can frequently be positively correlated with their vulnerability to the environment and to other animals.

Ethological (adaptive) theories on the function of sleep. Webb (1975) proposed that sleep serves the function of "keeping us out of harm's way" (p.159). He further stated that sleep patterns in each species are tailored to enhance their ability to survive, by providing restful "non response" time and by energy for hunting and foraging.

The final group of sleep function theories to be

discussed are the information processing/memory and learning group. This group of theorists tend to draw from all the aforementioned theories, or categories of sleep function theories. Indeed, one could plot the theories of the functions of sleep as a linear progression, each group of theories building on the previous set.

Information processing/memory and learning functions of sleep. Hartmann (1973) surveyed the biologic and psychologic literature and synthesized a theory of the function of sleep based on his findings. He proposed that there are separate functions of REM and NREM sleep; and that the NREM sleep functions are essentially preparatory for the REM sleep. During NREM sleep, the individual is performing anabolic processes, including the synthesis of RNA and proteins. The growth of anabolism and the formation of the RNA and protein molecules allows the function of "repair, reoganization, formation of new connections in the cortex and catecholamine...required for optimal attention mechanisms, secondary processes, and self guidance during waking" (p. 146).

Breger (1967) wrote that the primary function of sleep is to dream, which constitutes an integral part of the perceptual learning process. Dewan (1970), in a fashion similar to the already cited Gaarder, described the sleeping

brain using data processing terminology. He developed what is known as the "programming hypothesis". He describes the continual process of deciding how to categorize and use information as "programming". Simple programming occurs during waking hours, and more complex programming during sleep, especially during REM sleep. Indeed, the most complex programming, termed "metaprogramming" occurs during dreaming.

Greenberg and Leiderman (1966) and Greenberg, Pearlman, Fingar, Kastrowitz, and Kawlische (1970) also investigated the function of sleep from a data processing perspective. They viewed the function of sleep, particularly that of REM sleep, as the transfer to long term storage of recent memories, particularly those with heavy emotional significance to the individual. Valatyx (1972) stated that paradoxical sleep serves as an accelerator or catalyst of the data memory function of the brain.

The theories of the function of sleep are myriad; they range from simple "restorative" models which state that sleep simply replaces that which is lost to complex information and learning models which view sleep as a series of biochemical and neurochemical activities designed to facilitate the handling of information. While there is certainly no universal agreement on the function of sleep,

there is universal agreement that it is not an optional process. All human individuals, to maintain physical and psychological health, must sleep (Dement, 1973).

Insomnia

The inability to sleep, or sleep effectively, is known as "insomnia". The term "insomnia" is defined in a general usage dictionary as "chronic inability to sleep" (Morris, 1969, p.680). Sleep scientists, however, defined the term somewhat more specifically. Mendelson (1971) viewed insomnia as "The subjective feeling that an individual is not sleeping or not getting enough sleep. The important characteristic of insomnia is that it is a symptom, not a sign" (p. 109). Solomon (1956) defined insomnia as "the inability to fall asleep or maintain adequate sleep" (p. 735). Insomnia has been divided into three basic types: 1) delayed onset of sleep (initial insomnia), 2) early awakening (terminal insomnia) , and 3) sleep maintenance (frequent awakenings) (Williams & Karakan, 1978; Kleitman, 1963).

The Nosology Committee of the Association of Sleep Disorder Centers, cited in the Institute of Medicine (1979) monograph on insomnia, has developed a diagnostic classification of insomnia for use by clinicians and

scientists who deal with sleep disorders (p.88):

Disorders of initiating and maintaining sleep:

I. Psychophysiological
   a. Transient situational
   b. Persistent

II. Psychiatric disturbances
   a. Personality and neurotic character disorders
   b. Affective disorders
   c. Acute schizophrenia and other psychoses

III. Use of drugs and alcohol
   a. Tolerance to or withdrawal from CNS depressants
   b. Sustained use of CNS stimulants
   c. Sustained use or withdrawal of other drugs
   d. Habitual use or withdrawal of alcohol

IV. Sleep induced ventilatory impairment
   a. Sleep apnea
   b. Hypoventilation syndromes

V. Nocturnal myoclonus and "restless legs" syndrome.

VI. Other medical, toxic, and environmental conditions

VII. Childhood onset

Mendelson (1977), in his "Tentative List of Causes of Insomnia" (p. 112-115) developed a fairly comprehensive list of etiologic factors of insomnia; many of his categories are also included in the National Association of

Sleep Disorder Center's nosology:

I. Psychogenic

a. Anxiety

b. Depression

c Ruminative (attempting to solve problems interferes with sleep onset)

d. Sexual arousal

e. Fear of Phenomena Associated with sleep

1. Fear of loss of consciousness

2. Fear of death during sleep

3. Fear of content of dreams

4. Fear of not sleeping

f. Other psychiatric disturbances

II. Situational

a. Excess noise

b. Bright light

c. Uncomfortable beds

d. Sleeping without spouse

III. Environmental

a. Travel

b. Hospitalization

IV. Dream related

a. Dream interruption (aroused during REM and unable to return to sleep).

b. Nightmares/night panics

V. Sleep apnea

VI. Restless legs syndrome/ nocturnal myoclonus

VIII. Oversleeping

IX. Drug induced

X. Neurological

XI. Associated with medical problems

Insomnia Associated With Hospitalized Clients and those with Medical Or Surgical Disorders

Williams and Karakan (1978) observed that sleep impairment is associated with diseases of the respiratory, cardiovascular, gastro-intestinal, genitorurinary, hematopoietic, musculoskeletal, integumentary, and endocrine systems. Insomnia, or impaired sleep in the client with a medical-surgical disorder, may be the result of pain, anxiety, shortness of breath, altered autonomic activity, (including cardiac dysrhythmias,) hormonal changes, and/or diurnal changes in hemoglobin levels, electrolytes, and gastric secretions.

Clients who are hospitalized are exposed to numerous environmental and situational factors that have been associated with insomnia, or impaired sleep. Typically, the hospitalized client sleeps in a strange bed, in a noisy environment. He may have to share a room with others, when

he is used to sleeping alone, or, conversely, may be required to sleep alone when he is used to sharing his bed or room with another. Schedules for sleep, meals, and activity in the hospital may vary radically from the hospitalized clients personal daily routines.

Taub and Berger (1974) pointed out that even a small 1 to 3 hour shift in an individual's sleep-wakefulness cycle may significantly impair that individual's performance on tests desgned to measure cognitive abilities and response time as related to sleep loss. Abram (1969) noted that clients who are hospitalized demonstrate anxiety, depression, denial , repression and dependency as responses to their illnesses and to hospitalization.

A careful review of the literature available on the causes of insomnia, the impact of illness on quality of sleep, and examination of National Association of Sleep Disorder's Nosology (Institute of Medicine, 1979) suggest that the hospitalized client may be subject to impaired sleep. Faas (1971) reported that 51% of the hospitalized subjects she interviewed reported poor sleep during their hospital stay. J.W. Barnett (1979) observed that of all the "patient nights" spent in hospitals, 36.2% are associated with disturbed sleep and require the use of sleep inducing medications.

Effects of Sleep Deprivation

The bulk of the studies that have been completed concerning sleep deprivation measure response in subjects who have had their sleep cycles interrupted during or just prior to REM sleep. Only a few studies have examined the impact of slow wave or delta sleep deprivation. The effects of sleep deprivation have pronounced physiologic as well as psychologic responses. (Ax & Luby, 1965; Hales, 1980)

Studies by Hauri (1973) demonstrated that individuals deprived of sleep for periods as long as 10 days begin to function in such a way that the observor cannot determine from behavior, or EEG changes, if the subject is asleep or awake. Changes in subjects who are deprived of sleep for shorter periods of time are much less dramatic. Hauri noted that subjects who are deprived of delta or slow wave sleep are most like to exhibit physical symptoms of sleep deprivation, including malaise, musculoskeletal pain, and increased sensitivty to pain. Behaviors exhibited by individuals who are systematically deprived of REM sleep are primarily related to changes in mood and perception. Subjects deprived of Rem sleep tend to be aggressive, irritable, and somewhat depressed. (Agnew, Webb, & Williams, 1967; Naitoh, Pasnau, & Kollar, 1971)

Treatment of Insomnia

Recognizing that hospitalized clients are susceptible to sleep impairments, members of the health care team employ various therapeutic modalities designed to promote sleep. There are two basic ways of treating actual or potential insomnia in the hospital setting. The most common intervention is the use of sedatives and hypnotics. An alternative for promotion of sleep in hospitalized client is the use of behavioral methods, such as relaxation techniques, hypnosis, biofeedback, progressive muscular relaxation, and massage.

Pharmacologic Treatment of Insomnia in Hospitalized Clients. Mendelson (1980) estimated that 41% of hospitalized clients in United States health care facilities have sedatives or hypnotics prescribed for them during their hospital stay. Mendelson (1977) indicated the following characteristics should be present in any drug prescribed for long term use:

1. The drug should be given orally
2. It must produce a state with as little loss of natural sleep as possible.
3. The hypnotic effect should cease at the desired time without leaving any after effects.
4. There should be no side effects.

5. With prolonged use, the drug should continue to be effective, neither tolerance nor physical dependence should develop.
6. Overdoses should neither lead to prolonged sleep nor other dangers, including death.

Unfortunately, no currently available sleep inducing drug meets all of these criteria. The most frequently prescribed groups of sleep inducing drugs are the barbiturates and the benzodiazepines.

Studies conducted with the benzodiazepines (most frequently flurazepam) demonsrated that they shorten sleep latency (the time it takes to fall asleep), reduces the number of times one awakens during the night, and increase the total time asleep (Dement, 1973; Kales, Scharf,& Kales 1970).

It has not been clearly demonstrated that drug induced modification of REM or NREM sleep has any permanent deleterious effect. It has been demonstrated, however, that the benzodiazepines, while they do not shorten periods of REM sleep, do decrease the "density" of REM sleep, possibly decreasing its effectiveness (Dement, 1973). Kales, Kales, Scharf, and Tan (1970) noted that the withdrawal of drugs, such as flurazepam that decrease or modify REM, frequently cause a "rebound" of dense REM sleep

which may result in nightmares or night terrors. This effect is also occasionally noted during long term administration of these drugs.

The benzodiazepines (flurazepam, temazepam, and others), the most frequently prescribed group of sleep inducing drugs in this country, are not noted for creating physical dependency. Side effects associated with their use include: central nervous system symptoms such as residual sedation, drowsiness, lightheadedness, staggering gait, ataxia; gastrointestinal symptoms such as epigastric pain, nausea, vomiting, diarrhea; cardiovascular symptoms such as chest pain and palpitations, as well as muscle and joint pain and genitourinary complaints (Govoni & Hayes,1978). An additional risk to be considered when any drug is prescribed or administered is the possible interaction with other drugs. The benzodiazepines may cause potentiated or additive effects when given with the following drugs: alcohol, general anesthetics, tricyclic antipressants, antihistamines, barbiturates, central nervous system depressants, phenytoin, narcotics, phenothiazines, and non-barbiturate sleep inducing medications. The same drug interactions have been observed with the barbiturates, as well as interactions with anticoagulants (impaired absorption), steroids (decreased therapeutic effect),

antihypertensives (decreased effectiveness), and oral antihyperglycemic drugs (prolonged sedation) (Loebel, Spratto, & Wit, 1977).

One characteristic that distinguishes the barbiturates from the benzodiazepines is the frequency with which tolerance to the drug develops. Barbiturates are generally effective for an initial dose and only a few doses thereafter. They decrease sleep latency, intermittant awakenings and total sleep, but have been associated with a "hangover" effect. (Lasagna, 1956; Institute of Medicine, 1979). Because of the adverse effects associated with sleeping medications, or an effort to promote sleep in the most "natural" fashion possible, many clinicians have explored non-pharmacologic means for promoting sleep.

Non Pharmacologic Methods for Promoting Sleep. Ribordy and Denney (1977), in their overview of studies concerning behavioral methods for treating insomnia, concluded that behavioral therapies are based on three basic assumptions about insomnia: 1) insomnia results from excessively high levels of somatic arousal before and during sleep, 2) insomnia occurs in environments where there is lack of stimulus control, and 3) worry, by the insomniac, about his sleep tends to enhance, maintain, and exacerbate insomnia. Ribordy and Denney suggested that, given these assumptions,

behavioral methods of treating sleep impairment are more appropriate than the use of sleep inducing drugs, and are more likely to have a lasting effect.

Carr-Kaffashan and Woolfolk (1979) contrasted the efficacy of relaxation training and placebo treatment for sleep onset insomnia. The placebo treatment included a counterdemand (This treatment will not begin to work immediately, but will become more effective after several sessions) and a demand (this treatment should start becoming effective now.) phase. The relaxation group showed a statistically and clinically significant decrease in sleep latency; the placebo group showed no change during the counterdemand phase of the study, but sleep latency improved substantially with the introduction of positive expectancy during the demand phase of treatment.

Browman and Tepas (1976) examined the effect of pre-sleep activity on sleep onset. The subjects were divided into three groups, all experimental treatments were administered immediately prior to the subject's sleep period. The first group of subjects received formal relaxation training; the second group exercised; and the third group participated in an activity designed to be boring. The group who had participated in relaxation exercises showed the shortest sleep latency, and the group

who had been involved in the boring activity showed the most lengthy sleep latency. The authors pointed out that promoting sleep by modifying presleep activity is more desirable than methods of sleep promotion that alter the sleep cycle itself.

Several studies have been conducted examining the use of hypnosis for the promotion of sleep. Anderson, Dalton and Basker (1979) compared the use of autohypnosis to treatment with a placebo or with a benzodiazepine (nitrazepam) and found autohypnosis to be as effective as the use of a placebo or a sleep inducing drug in the reduction of sleep latency. The autohypnosis technique suggested included "guided imagery", that is, concentration on a warm, safe, pleasant place by the subject.

Bauer and McCane (1980) suggested that the efficacy of hypnosis in sleep promotion is a function of the expectancy effect or decreased cognitive activity by the subjects. Graham, Wright, Toman, and Mark (1975) contrasted the effectiveness of hypnosis and relaxation training using a subjective sleep rating scale; all subjects reported improvement in sleep. The physiologic data gathered by the researchers, however, demonstrated that only the group involved in the relaxation training showed any physiologic evidence of relaxation.

Borkovec and Fowles (1973) contrasted the effects of progressive relaxation and hypnosis, as well as self relaxation methods and no treatment on sleep promotion. The groups using progressive relaxation and hypnosis showed the greatest improvement. However, the subjects using self relaxation methods (methods that had worked well for them in the past) reported results that were nearly as significant as those of the the subjects in the treatment groups.

Borkovek and Hennings (1978) contrasted sleep latency and general tension in two groups of subjects. The first group participated in tension/release relaxation combined with focusing activities; the second group used tension/release relaxation only. Sleep latency and general tension were reduced in both groups; however, the reduction in general tension was most pronounced in the group that used tension/release exercises only.

The elicitation of the relaxation response in groups practicing progressive muscular relxation, as decribed by Jacobson (1938) and Wolpe (1958), and transcendental meditation was observed by Warrenburg, Pagano, Woods, and Hlastala (1980). The group of subjects who had been long term practicioners of progressive muscular relaxation showed the greatest reduction in somatic activity, which relates to improved sleep onset and duration.

The place of EMG or biofeedback in the promotion of sleep has also been examined by several authors. Coursey, Frankel, Gaarder, and Mott (1980) contrasted sleep latency following autogenic training or biofeedback training. Approximately one-half of the treatment subjects demonstrated marked improvement in sleep latency which was sustained for at least 1 month. There was no difference between the treatment groups, however. Freedman and Papsdorf (1976) also noted no significant difference in sleep latency between progressive muscular relaxation and biofeedback groups.

Progressive muscular relaxation's relation to promotion of sleep has been studied extensively. Borkovek and Weerts (1976) designed a study observing the effects of progressive muscular relaxation on sleep disturbance using the objective measures of Stage I and Stage II EEG readings, as well as sleep reports of sleep onset and daily sleep questionnaires. The concept of demand and counterdemand was also included in the study. The experimental group showed a significant decrease in reported sleep latency, which was substantiated by the Stage I EEG readings. The self-reported decrease in sleep latency was sustained for at least a year.

Turner and Ascher (1979) compared progressive relaxation, stimulus control, and paradoxical intention

therapies for insomnia:

> Failure to obtain differences among any of the treatment groups may be partly explained by two factors: 1) It is possible that each of the three therapeutic modalities specifically suited to one type of sleep disturbance or 2) each of the treatments was effective with regard to a common component shared by all (p. 507)

Pendleton and Tasto (1976), noting that progressive muscular relaxation training requires the use of a therapist, contrasted its use with metronome-induced relaxation. They observed that both groups showed an improvement in sleep disturbance; but, that again, the difference between the groups was not significant.

The effectiveness of variety of general "relaxation" methods has also been studied. Shealy (1979) studied sleep latency in five groups: 1) relaxation without muscle tension, 2) stimulus control and relaxation without muscle tension, 3)placebo, 4) self-monitoring, and 5) waiting list. A decrease in sleep latency was noted in the experimental groups which was slightly greater in the relaxation with stimulus control group.

Borkovek, Steinmark, and Nau (1973) contrasted relaxation, desensitization with relaxation, and desensitization without relaxation practice. They noted an improvement in sleep latency in all groups, with a slightly more significant increase in the group using both

desensitization.

French and Tupin (1974) describe a treatment for sleep which consists of assisting the subject to relax breathing and muscles, and then have the subject allow his mind to wander to a pleasant memory, focus on it, using the memory as a "mantra." Although the sample group was extremely small, French and Tupin reported a significant decrease in anxiety and sleep latency in their subjects.

Nursing Interventions for the Promotion of Sleep. Nursing interventions designed to promote sleep have included both pharmacologic and non-pharmacologic, or behavioral treatments. Traditional nursing measures for the promotion of sleep include the use of a back rub, the provision of a quiet atmosphere and the administration of medication as directed by a physician. Recently, some nurses have integrated the concepts of transcendental meditation, biofeedback, the relaxation response, and hypnosis into their clinical practice. A search of the nursing literature reveals a lack of studies observing the effectiveness, or lack of effectiveness of nursing interventions designed to promote sleep.

Summary

The concepts of touch, relaxation, sleep, and insomnia were broadly reviewed. Touch is seen primarily as a very basic, but very potent means of communication. Studies have demonstrated that the judicious use of touch in the clinical setting is associated with an increase in a sense of well being on the part of both the health care practicioner and the client. Krieger's concept of therapeutic touch, a specialized application of touch designed to mobilize energy fields associated with wellness, was also briefly discussed. There are few completed studies demonstrating the effectiveness of therapeutic touch, but more are in progress. A traditional use of touch in nursing, the common back rub was also briefly addressed.

There is no general agreement among theorists on the function of sleep. Theories of the function of sleep include physiologic theories, psychophysiologic theories, and information processing/learning theories. Those who subscribe to the physiologic theories of the functions of sleep, feel that sleep serves to restore, to protect, and to conserve energy. The psychophsiologists hold that sleep is instinctive and/or adaptive in nature. The final group of theorists believe that the function of sleep is to allow the brain to sort and process various kinds of data received

during waking and sleeping hours.

The relaxation response has been identified as a wakeful hypometabolic state associated with specific autonomic and somatic changes. The elicitation of the relaxation response is associated with a decrease in pain, hypertension, somatic symptoms, anxiety, and an increase in a sense of well being. Various methods of eliciting the response were reviewed.

The causes of insomnia, physical, psychological, situational, and environmental were discussed. There are basically two ways of treating insomnia: 1) pharmacologic and 2) behavioral. The major pharmacologic agents, their risks and side effects were noted. The behavioral modalities for the treatment of insomnia include autogenic training, relaxation training, biofeedback, hypnosis, and progressive muscular relaxation. Most studies supported that these modalities were useful in decreasing sleep latency, but few demonstrated any difference in the effectiveness of the different treatments.

Chapter 3

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

The problem of this investigation was to relate specific nursing interventions, designed to strengthen the flexible line of defense, to the perceptions of hospitalized clients of the quality of their sleep and to the number of sleeping medications taken. The comparative evaluation study was classified as a quasi-experimental investigation rather than as a "true" experiment. Kerlinger (1973) stated that the criteria for a "true" experiment include the manipulation of an independent variable by the investigator; and selection of the sample at random from the population. Polit and Hungler (1978) state that quasi-experiments "lack at least one of the three properties which, as we have seen, characterize an experiment. The missing ingredient is always either the randomization or the control group component (or both)" (p. 163).

The subjects in this study comparing and evaluating the effectiveness of relaxation techniques on the quality of sleep were not randomly selected from the population. They were assigned to their respective treatment groups, however, using a table of random numbers. The design selected for

this quasi-experimental study was an equivalent group, post test only design, illustrated in Table 1.

Table 1

Sequence of Events by Treatment Groups

Treatment Group	Sequence of Events		
Group I	RA	X/A	O/1, O/2
Group II	RA	X/B	O/1, O/2
Group III	RA	X/C	O/1, O/2
Group IV	RA		O/1, O/2

RA = Random Assignment to a treatment group
O/1 = Observation: Number of times PRN medication taken
O/2 = Observation: Perception of Quality of Sleep
X/A = Verbal and Tactile Relaxation Treatments
X/B = Verbal Relaxation Treatment
X/C = Tactile Relaxation Treatment
N = 40

Setting

The clients who participated in this study were selected from a group of individuals being treated as inpatients in a large metropolitan hospital in the southwest United States. The relaxation treatments were conducted in the patient room to which the client was currently assigned. The patient rooms were either private rooms, or rooms in which only one other bed was occupied. The relaxation exercises were conducted with the client lying in bed; the door closed, and the privacy curtains drawn.

Hospitals have unique auditory environmental characteristics, such as the sounds associated with the delivery of patient care, the voices of the staff, and the paging system. As a result, the nature of the environmental stimuli during the relaxation exercises varied from client to client. No exceptional environmental stimuli such as a fire drill or cardiopulmonary arrest page occurred during the administration of any of the experimental treatments. No attempt, other than the closing of the door to the corridor was made by the investigator to control hospital environmental factors.

Population and Sample

The population for this study consisted of all the inpatients who met the delimitations of the study. The sample was drawn from this group. All subjects for the study had sleep inducing medications prescribed for them on a PRN basis. The following potential subjects were excluded from participating in the study:

a. Those clients who were assigned to a Critical Care area (Intensive Care Unit).
b. Those clients who were scheduled for surgery the following day.
c. Those client who had surgery within the 48 hours prior to the experimental treatment.

d. Those clients who had taken intramuscular or intravenous pain medications during the 24 hours prior to the experimental treatment.

e. Those clients who had sleeping medications prescribed for them on a routine rather than a PRN basis.

f. Those subjects who had medical or nursing procedures prescribed for them that could be reasonably be expected to interrupt sleep.

g. Those subjects assigned to patient rooms to which more than one other patient had been assigned.

Subject selection was conducted by the nurse investigator, who obtained from the Charge Nurse or Head Nurse a list of all patients currently assigned to patient rooms on the nursing unit. Due to the nature of the exclusions of subjects, many subjects were obtained from medical rather than surgical nursing units. During the course of the study, five patients who had given consent were excluded because of additional information obtained from their patient record. Most frequently, this was a physician order written late in the afternoon for a

procedure that might have been reasonably expected to interfere with the client's sleep that night. In three of the five cases where consent had been obtained, and the client was subsequently excluded, the consent was reaffirmed in a day or two, and the experimental treatment given. A total of 48 potential subjects were approached. Forty subjects participated in the study.

Protection of Human Subjects

The proposal for this investigation was approved by the Texas Woman's University Human Research Review Committee (Appendix A). Following approval by the Human Research Review Committee, the proposal was reviewed by agency personnel, and consent for agency participation obtained (Appendix B).

To insure the protection of human subjects, the written informed consent of all subjects who participated in the study was obtained (Appendix C). The subjects were informed of the purpose, potential benefits, and potential risks of the research. They understood they had the option of not participating in the research, and the right to withdraw from participation at any time. The subjects were assured, both at the time informed consent was obtained, and at the time of the treatment itself that their care would not be altered in any way by their participation in the

research. The subjects were also informed that their response to the relaxation exercises was to be treated in a confidential manner, and their identity would not be revealed in any preliminary or final report of the research.

Initially, the investigator visited, alone, potential subjects who were eligible for inclusion in the study. Four of the first 10 subjects approached declined to consent to participate. The process of obtaining consent was reviewed, and several observations made by the investigator. The forms used for the informed consent were initially typed on three separate sheets, stapled together. The volume of the material was decided to be inhibiting to some clients. Subsequently, the investigator combined the forms onto both sides of one sheet of paper without any change in content or the size of the print.

The investigator also identified personal discomfort with the consent process and "role played" the interview with colleagues several times before approaching any more clients. Finally, despite the fact that the investigator was clearly identified, wore a uniform, and was carrying the agency consent form, it was considered that it might be difficult for potential subjects to trust or relate to a stranger who was asking them to particpate in a research study and sign a lengthy document. After much

consideration, the investigator opted to have a member of the hospital staff, familiar to the patient, frequently the primary nurse or the Head Nurse, accompany her during the initial client contact. Care was taken to assure that this member of the hospital staff would not be on duty during the time when the experimental treatment was conducted, nor during the shift immediately following. After these modifications in the consent process, the informed consent of potential subjects was easily obtained.

Instruments

Two basic forms were used to obtain the data for analysis in this study. The first form was a visual analogue scale consisting of a 10 centimeter line labeled "0" at the left end and "10" at the right end (Appendix D). The client's mark on the line, relecting his personal perception of the quality of his sleep, was then compared against a 10 centimeter rule, yielding interval data.

The visual analogue is used most frequently by researchers studying clinical pain, but has also been used to measure anxiety, depression, and sleep (Huskisson, 1974; Jacox, 1977). Clark and Spear (1964) concluded that the use of the visual analogue for measurement of the concept of well being was both sensitive and reliable. Jacox (1977) commented:

> The main advantage of the visual analogue scale is the avoidance of numbers or word descriptors. The subject is not required to relate specific words or numbers to his or her pain experience, but is free to indicate on a continuum the intensity of the pain sensation relative to the two extremes. Also, the assumption of equal intervals can be met, which simplifies quantification and analysis (p.113).

The second form utilized was the demographic data sheet (Appendix E). Data recorded on this form included age, sex, diagnosis, hospital day, treatment, visual analogue score, and record of PRN sleep inducing medications taken. No identifying information, patient name, hospital number, or room number appears on the demographic data sheet. This information was obtained for description of the sample.

Data Collection

Subject selection was conducted personally by the investigator. Following the receipt of a list of patient names from the staff of the nursing unit, the nurse investigator reviewed the nursing care plan and the medication administration records of the patients, which, in the agency were kept separately from the remainder of the patient record. After exclusions were made, based on review of the nursing care plan and medication administration record (which lists all PRN medications prescribed whether the patient is taking them or not), the investigator began the process of obtaining the informed consent of potential

subjects.

After informed consent was obtained from the subject, the investigator explained to each subject that the study would be conducted after 9 p.m. that evening. The subject was instructed to complete his or her usual "bedtime" activities by that time.

The Night of the Experimental Treatment

After 9 p.m., the investigator confirmed, verbally, that the subject wished to remain a part of the study, and that he was ready to participate in the relaxation exercise at that time. The patient room was darkened and the door to the exterior corridor closed. After this point, the treatment of each of the three experimental groups varied. An illuminated liquid crystal display elapsed time watch to measure time intervals during the experimental treatments was used by the investigator.

Group I (Verbal Relaxation Group). The subject assumed a comfortable position in bed, lying on his abdomen, side or back. The choice was that of the subject. The investigator seated herself near the head of the bed; asked the subject to close his eyes and follow her instructions. All instructions to all subjects in all groups, from this point on, were delivered in a low, controlled voice that bordered on a monotone. All instructions were enunciated clearly,

and spoken slowly.

In the verbal relaxation group, the investigator began first with the imaging/focusing exercises (Appendix F). The Imaging exercise continued until the investigator observed the following referents: decreased respiratory rate, increased respiratory excursion, and decreased or absent voluntary movement.

At this point, the investigator proceeded with the progressive muscular relaxation exercise (Appendix G), alternating between the imaging/focusing exercises and progressive muscular relaxation for the duration of the treatment, 5 to 7 minutes. If the relaxation referents had not occurred after 3.5 minutes of imaging/focusing treatment, the investigator proceeded to the progressive muscular relaxation exercise.

Group II (Tactile Relaxation Group). The subject assumed a comfortable position in bed, lying on either his abdomen or his side. The choice was that of the subject. The investigator, after asking the subject to close his eyes, the investigator than began to rub the client's back using the lotion supplied in the patient admission kit by the hospital.The subjects in this treatment group did not receive either progressive muscular relaxation exercises or focusing/imaging exercises (Appendix H).

Group III (Tactile/Verbal Relaxation Group). The subject assumed a comfortable position in bed, lying on either his abdomen or his side The choice was that of the subject. The investigator then asked the subject to close his eyes and follow her instructions. The investigator than began to rub the client's back using the lotion supplied in the patient admission kit by the hospital. As the investigator entered step two of the back rub procedure, she began the focusing/imaging exercises, continuing the back rub and the focusing/imaging exercises simultaneously.

When the investigator noted, by inspection and palpation during the back rub, that the general voluntary motor movement of the subject had decreased, that the respiratory rate had decreased, and that the respiratory excursio had increased, the progressive muscular relaxation exercise were begun. However, if the above mentioned relaxation referents had not occurred after the back had been rubbed for 3.5 minutes the investigator proceeded with the progressive muscular relaxation exercises.

The back rub, focusing/imaging, and progressive muscular relaxation exercises terminated 5 to 7 minutes after inception. Termination consisted of cessation of verbal guidance by the investigator followed by a decrease in the intensity of the back rub. The back rub was

terminated in Step III of the back rub protocol.

Group IV (No Treatment). The subjects of this group served as a control for this study and did not participate in any structured intervention by the investigator. The only treatment received was the routine nursing care provided by the hospital nursing staff.

The Morning Following the Experimental treatment

On the morning following the experimental treatment, the client was presented with the visual analogue scale and asked by the investigator to rate the quality of his sleep by responding to the following question: "Please make a mark on this line rating your sleep last night. A "0" is a very restless night with very poor sleep, and a "10" is a very good, very restful night's sleep". The investigator was cognizant of the possibility of client's responding with an unusually high rating to "do the right thing" or to please the investigator. In order to minimize this effect, when the investigator entered the client's room on the morning after the experimental treatment, she first asked the questions "good morning. . . how did you sleep last night?". The investigator reasoned that a client who answered "oh, not well at all" would be less likely to follow that verbal remark with an artifically inflated

score. In two instances subjects asked "What should I write? I want you to get a good grade." In both instances, the subjects were reminded to give an "honest" answer, and that the investigator would not be disappointed or disturbed if the perception of quality of sleep was low. Following the rating of the quality of sleep, the mark on the line was compared against a ruler marked in centimeters (a small metal ruler was used for a all measurements) and interval data obtained and recorded. The investigator then reviewed the medication record for each subject for the previous night, recording the number of times doses of PRN medications were taken for sleep or rest (as previously defined).

Treatment of Data

At the conclusion of the study, 40 sets of data had been collected. Each set consisted of two observations: 1) the quality of sleep as perceived by the client (interval data) and 2) the number of times doses of sleep inducing medications were taken by the client (ordinal data). In order to ascertain if there existed a significant difference between the treatment groups, an analysis of variance (ANOVA) was performed.

The analysis of variance is useful for stating that there is or is not a significant different between the

groups. It will not, however, identify which group is the source of the variance (Polit & Hungler, 1978). To determine which of the groups vary most, it was necessary to perform the Student Newman-Keuls statistic, a variation of the least significant difference method of multivariate analysis (Kushner & DeMaio, 1980; Namboodiri, 1975; Zar, 1974). The .05 level of significance was used.

CHAPTER 4

ANALYSIS OF DATA

This comparative evaluation, quasi-experimental study was conducted to determine if any relationship existed between the use of relaxation techniques designed to promote sleep, the client's perception of quality of sleep, and the number of PRN doses of sleep inducing medication taken during the sleep period following the experimental treatment. The data gathered was obtained from a visual analogue scale completed by the subject, the review of the number of doses of PRN sleep inducing medications taken, and the completion of a demographic data sheet. In this chapter, that data will be analyzed and interpreted.

Description of the Sample

The study sample consisted of 40 individuals who were hospitalized as inpatients in a large metropolitan hospital for a variety of medical-surgical disorders. The admitting diagnoses included cardiovascular problems such as congestive heart failure, acute myocardial infarction and hypertension; respiratory disease including asthma and chronic obstructive pulmonary disease; gastrointestinal disorders including acute colitis and cholecystitis; as well

as several patients with malignant tumors. The day of hospitalization at the time of the experimental treatment varied from 1 to 27 days. The mean age of the sample was 56.2 years, with a range of 26-83 years. Male subjects comprised 52.5% of the sample, with a mean age of 54.3 years, and a range of 26-83 years. Female subjects comprised 47.5% of the sample with a mean age of 58.15 years, and a range of 28-81 years. The distribution of subjects by age and sex in the various treatment groups is summarized in table 2.

Table 2

Distribution of Sample by Age and Sex

Demographic Variables	Type of Group Control	Verbal	Tactile	Tactile/ Verbal
AGE				
Mean	59.9	50.60	57.80	56.30
S.D.	14.35	16.17	17.52	16.03
Min	36	26	32	26
Max	82	81	80	75
SEX				
Male	3 (30%)	7 (70%)	5 (50%)	6 (60%)
Female	7 (70%)	3 (30%)	5 (50%)	4 (40%)

N=40

The range of the ages of the subjects was so subtantial that an ANOVA was performed on the age distribution to note

if any significant difference existed in the age among the groups. No significant age difference was found. At the .05 level of confidence, F (3,36)=.62, p=.61 (Table 3).

Table 3

Analysis of Variance
Ages of Subjects
Among Groups

Source of variance	SS	df	MS	F	p
Between Groups	476.10	3	158.70	0.62	.609
Within Groups	9279.00	36	257.75		
Total	9755.10				

N=40

Findings

The first hypothesis for this study was: "There is no significant difference in the number of doses of "pro re nata" medications taken by four groups of hospitalized clients:

a. Verbal and tactile relaxation treatment group

b. Verbal relaxation treatment group

c. Tactile relaxation treatment group

d. No relaxation treatment group

The means and standard deviations for the number of PRN medications taken by the subjects in each group is listed in Table 4.

Table 4

Number of Doses of PRN Medications
Taken by Subjects

	Type of Group			
	Control	Verbal	Tactile	Tactile/verbal
Mean	0.400	0.800	0.700	0.500
S.D.	0.699	0.919	0.648	0.919
Median	0.000	0.500	0.700	0.500
Minimum	0.000	0.000	0.000	0.000
Maximum	2.000	2.000	2.000	2.000

An ANOVA was performed on the number of doses of PRN medications taken by subjects. There was no significant difference found in the number of doses of PRN medications taken by the subjects in the different groups at the 0.05 level of confidence, F (3,36) = .58, p=.63. Therefore, the null hypothesis was accepted. the results are summarized in Table 5.

Table 5

Analysis of Variance
Number of Doses of PRN Medications
Taken by Subjects

Source of Variance	SS	df	MS	F	p
Between Groups	1.00	3	0.3333	0.58	.630
Within Groups	20.60	36	0.5722		
Total	21.60	39			

N=40

The second hypothesis for this study stated: " There is no significant difference in the perception of the quality of their sleep during the previous 12 hours by four groups of hospitalized clients:

a. Vebral and tactile relaxation treatment group

b. Verbal relaxation treatment group

c. Tactile relaxation treatment group

d. No relaxation treatment group

The means and standard deviation of the perception of quality of sleep scores are summarized in Table 6.

Table 6

Perception of Quality of Sleep

	Type of Group			
	Control	Verbal	Tactile	Tactile/Verbal
Mean	5.31	4.54	7.98	8.22
S.D.	3.14	3.27	2.22	1.73
Median	5.30	5.00	8.50	8.65
Minimum	0.50	0.00	3.10	4.90
Maximum	9.50	9.00	10.00	10.00

N=40

An ANOVA was also performed on the perception of quality of sleep reported by the subjects in the experimental and control groups. A difference between groups reporting the quality of sleep was found at a 0.05 level of

significance, F (3,39) = 4.87, p=.006. The ANOVA is summarized in Table 7.

Table 7

Perception of Quality of Sleep
Morning Following Treatment

Source of Variance	S.S.	df	Ms	F	p
Between Groups	104.06	3	34.69	4.87	.006
Within Groups	256.57	36	7.13		
Total	360.62	39			

N = 40

A significant difference between groups reporting the quality of sleep was found and the null hypothesis rejected. The ANOVA did not identify the source of variance among the groups. In order to determine which group or groups were the source of the variance in perceived quality of sleep, a Student Newman-Keuls multiple comparison test was performed. The Student Newman-Keuls showed that the tactile/verbal and the tactile relaxation groups scored significantly higher on the visual analogue scale than did the verbal relaxation treatment group or the control group. The results of the Student Newman-Keuls comparison are summarized in Table 8.

Table 8

Newman-Keuls Multiple Comparison
Perception of Quality of Sleep

Mean Differences		P	Q	Critical Q (.05)
Group 3 - Group 2	3.68	4	4.359	3.81
Group 3 - Group 4	2.91	3	3.48	3.46
Group 3 - Group 1	0.24	2	2.87	2.87
Group 1 - Group 2	3.44	3	4.08	3.46
Group 1 - Group 4	2.67	2	3.16	2.87
Group 4 - Group 2	0.77	2	0.91	2.87

Group 1 = Tactile Treatment Group ($\bar{x}$ = 7.98)
Group 2 = Verbal Treatment Group ($\bar{x}$ = 4.54)
Group 3 = Tactile/Verbal Treatment Group ($\bar{x}$ = 8.22)
Group 4 = Control Group ($\bar{x}$ = 5.31)

Summary of Findings

The findings of the study are as follows:

A. Age of the subjects was not a significant factor among the groups.

B. There was no significant difference in the number of "pro re nata" medications taken by four groups of hospitalized clients:

1. Verbal and tactile relaxation treatment group
2. Verbal relaxation treatment group
3. Tactile relaxation treatment group
4. No relaxation treatment group

C. There was a significant difference in the

perception of the quality of their sleep during the previous twelve hours by four groups of hospitalized clients:

1. Verbal and tactile relaxation treatment group
2. Verbal relaxation treatment group
3. Tactile relaxation treatment group
4. No relaxation treatment group

D. The treatment groups which received tactile intervention reported signficantly higher perceptions of the quality of their sleep than did the groups that received no tactile relaxation intervention.

Chapter 5

SUMMARY OF THE STUDY

The effects of various relaxation treatments on the quality of sleep in the hospitalized client has not been studied frequently. This study was designed to evaluate the effect of verbal, tactile, and combined verbal and tactile relaxation treatment techniques on the number of doses of PRN sleep inducing medications taken by a client, and the perception of the quality of sleep of hospitalized patients. This chapter includes the summary and discussion of the findings, the conclusions, implications for the practicing nurse, and recommendations for further study.

Summary

According to Neuman (1982) nursing interventions should be planned to strengthen the flexible line of defense. Sleep is a complex function with developmental, physiological, and psycholologic components. In the hospitalized client, penetration of the normal line of defense by sleep impairment may result in a variety of symptoms such as fatigue, generalized discomfort, personality changes, and anxiety. The client may then regress even further in the direction of illness along the

health-illness continuum. Nursing interventions that help promote quality sleep in hozpitalized patients will not only strengthen the patient's normal lines of defense, but may also facilitate reconstitution and movement of the patient in a positive direction along the health-illness continuum.

The problem of the study was:

Is there a difference in the number of doses of PRN sleep inducing medications taken and the perception of the quality of sleep among four groups of hospitalized clients:

a. Verbal and tactile relaxation treatment group

b. Verbal relaxation treatment group

c. Tactile relaxation treatment group

d. No relaxation treatment group

The study was conducted at a large metropolitan hospital in the southwestern United States. The population from which the sample was selected consisted of adult patients with medical-surgical disorders who had not been admitted to a psychiatric or critical care area, who were not taking parenteral pain medication, and were not going to surgery the next day. Forty subjects were selected and their informed consent obtained. The 40 subjects were assigned to one of four groups using a table of random numbers:

a. Verbal relaxation treatment group

b. Tactile relaxation Treatment group

c. Verbal/Tactile relaxation treament group

d. No relaxation treatment group

The experimental treatments (described in appendices D-H) were then administered. The following morning, the investigator asked each subject to rate the quality of his sleep during the last night on a visual analog scale. The investigator also reviewed the medication records for each subject and recorded the number of doses of sleep inducing PRN medications taken during the night following the experimental treatment.

The findings of the study were:

a. There was no difference in the numbers of times doses of PRN medications were taken among the groups

b. There was a difference in the perception of quality of sleep among the groups

c. The patients who had received tactile relaxation treatment or tactile/verbal relaxation treatment reported significantly higher perceptions of the quality of sleep than reported by patients who had received verbal relaxation or no relaxation treatment.

d. The four treatment groups were homogenous with

respect to age.

Discussion of the Findings

The use of relaxation techniques was not related to the number of pain or sleeping medications taken by the subjects of the study. The review of the literature does not reflect that the relationship between amounts of sleep inducing medication taken and the use of relaxation techniques to promote sleep has ever been studied. Tamez, Moore, and Brown (1978) noted that the use of relaxation techiques with psychiatric patients did not signficantly effect the number of doses of anti-psychotic or anti-anxiety drugs taken. Wells (1982) reported similar results in analgesic use by post-operative patients after relaxation training.

In at least two instances during the course of the study, the subject received a sleeping medication within 5 minutes of the conclusion of the relaxation treatment. It is difficult to determine the significance of this phenomena without thoroughly understanding the criteria nurses use to administer PRN sleep inducing medication. Was the medication requested by the patient? Was it offered by the nurse "here. . .this will help you sleep" or was it merely added to the medication cup with drugs the patient is scheduled to receive routinely? The assumption that PRN sleeping medication is administered to clients at their

request or following a nursing assessment of need may be invalid. Another dependent variable may be a more appropriate measure of the effectiveness of sleep promoting interventions.

The perceived quality of sleep, was related to the use of tactile intervention with or without verbal relaxation assistance. This finding supports the work of Marshall and Strawbridge (1972). They compared several relaxation methods, and found that while all did increase the relaxation of the subjects, no one method could be considered statistically superior to another. Evans (1976) observed that eclectic relaxation treatment methods are at least as effective as the more involved, traditional relaxation treatments such as autogenic training, or Jacobson's (1938) progressive muscular relaxation.

Patients who received back rubs reported that they slept more comfortably than those who did not. Indeed, during the course of the investigation, two clients asked "nurses always used to do this to patients, why did they stop?" Two other patients who had reported low scores on perception of the quality of their sleep, apologized stating "I slept very well until . . " in one instance, a physician had made his rounds at 11:30 p.m., and in the second, the client's roommate became extremely ill during the night,

disturbing his sleep. During the course of one back rub, a nurse entered the room and noted with surprise "Why! You put him to sleep!"

The duration of the back rub was specifically controlled to help establish that an intervention that requires relatively little time may be efficacious in promoting relaxation. The investigator observed, several times, that even the 5 minute back rub "felt" longer than necessary, that a 3 minute back rub would have accomplished the same end. One patient, who received a 6 minute back rub, however, did not agree, "I think your back rub is too short, and not vigorous enough." He also reported that he frequently received osteopathic manipulation and massage by an athletic masseuse.

Although not measured, the satisfaction of the patient with the hospital and its staff, may have been positively impacted. Verbal comments of patients regarding the back rub were extremely positive. Several of the control group expressed disappointment at not having been given a back rub, and were subsequently given one by the investigator, independent of the study. It is interesting to note that no subject made any comment, positive or negative, in reference to the verbal relaxation guidance.

During the administration of the verbal only relaxation

treatment, the investigator felt ill at ease, and inhibited by the protocol-required lack of tactile contact and the lack of a pre-existing therapeutic relationship between the patient and the investigator. Borkovek and Sides (1979) noted that the use of taped relaxation exercises over several sessions shortened the time for the onset of sleep more effectively than the use of isolated tapes, or investigator conducted relaxation exercise. One may speculate that the repeated use of a verbal relaxation exercise tape may allow a client to become more familiar and comfortable with the technique. The presence of the investigator may also be construed as a source of discomfort or anxiety provoking for the client.

Since all the experimental treatments were conducted personally by the investigator, there is a strong possiblity that the personality and manner of the investigator may be an important confounding variable, limiting the generalizability of the study. This variable may have effects on both the low scores associated with the verbal relaxation treatment and the high scores associated with the tactile relaxation treatment. The investigator attempted to control this variable as much as possible by adhering rigidly to the treatment protocols described in the appendices.

Conclusions and Implications

The findings of the study clearly suggested that the traditionally prescribed back rub may, indeed, facilitate the promotion of quality sleep in hospitalized patients, but does not, however, have any relationship to the number of doses of PRN sleep inducing medications taken. The study also found that there was no significant difference in the quality of sleep perceived by clients who had received back rubs only and those who received both the back rub and the verbal relaxation assistance. Implications for the practicing nurse include:

a. The nurse should consider integrating, again, the backrub into the routine nursing care provided to hospitalized clients.

b. The nurse should consider the backrub an potentially effective non-pharmacologic means of promoting sleep in hospitalized patients.

Recommendations for Further Study

Based on the findings of the study, the following recommendations for further study were made:

1. Teach the back rub and verbal techniques to a group of nurses, who will then administer the treatment to clients, measuring their perceived

quality of sleep.

2. Replicate the study with an investigator relatively unknown to the subject, using a tape recorder, designed to turn off automatically, for the verbal only relaxation treatment.
3. Conduct a study to determine if there is any relationship between the duration of a backrub and the perception of the quality of sleep.
4. Search for an indicator other than number of doses of PRN sleep inducing medications that will reflect the quality of sleep.

APPENDIX A

TEXAS WOMAN'S UNIVERSITY
Box 23717, TWU Station
Denton, Texas 76204

1810 Inwood Road
Dallas Inwood Campus

HUMAN SUBJECTS REVIEW COMMITTEE

Name of Investigator: Katherine M. Robinson Center: Dallas

Address: 705 Marlow Place Date: 5/8/81

Arlington, Texas 76014

Dear Ms. Robinson:

Your study entitled Promoting Sleep in Hospitalized Clients Using Relaxation Techniques

has been reviewed by a committee of the Human Subjects Review Committee and it appears to meet our requirements in regard to protection of the individual's rights.

Please be reminded that both the University and the Department of Health, Education, and Welfare regulations typically require that signatures indicating informed consent be obtained from all human subjects in your studies. These are to be filed with the Human Subjects Review Committee. Any exception to this requirement is noted below. Furthermore, according to DHEW regulations, another review by the Committee is required if your project changes.

Any special provisions pertaining to your study are noted below:

_____ Add to informed consent form: No medical service or compensation is provided to subjects by the University as a result of injury from participation in research.

_____ Add to informed consent form: I UNDERSTAND THAT THE RETURN OF MY QUESTIONNAIRE CONSTITUTES MY INFORMED CONSENT TO ACT AS A SUBJECT IN THIS RESEARCH.

_____ The filing of signatures of subjects with the Human Subjects Review Committee is not required.

_____ Other:

__X__ No special provisions apply.

Sincerely,

Estelle D. Kurtz

Chairman, Human Subjects
Review Committee

at Dallas

PK/smu/3/7/80

APPENDIX B

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE [redacted]

GRANTS TO Katherine M. Robinson, R.N., B.S.
a student enrolled in a program of nursing leading to a Master's Degree at Texas Woman's University, the privilege of its facilities in order to study the following problem.

> Is there a relationship between the use of non-pharmacologic relaxation techniques and the promotion of sleep in hospitalized individuals?

The conditions mutually agreed upon are as follows:

1. The agency (may) (may not) be identified in the final report.
2. The names of consultative or administrative personnel in the agency (may) (may not) be identified in the final report.
3. The agency (wants) (does not want) a conference with the student when the report is completed.
4. The agency is (willing) (unwilling) to allow the completed report to be circulated through interlibrary loan.
5. Other _____

_____

_____

Date: _____ [redacted]
Signature of Agency Personnel

_____ Beth A Vaughan - MSN 2W F.C.D.
Signature of Student Signature of Faculty Advisor

*Fill out & sign three copies to be distributed as follows: Original - Student; First copy - Agency; Second copy - TWU College of Nursing.

APPENDIX C

Consent Form
TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING

Consent to Act as a Subject for Research and Investigation:

The following information is to be read to or read by the subject. One copy of this form, signed and witnessed, must be given to each subject. A second copy must be retained by the investigator for filing with the Chairman of the Human Subjects Review Committee. A third copy may be made for the investigator's files.

1. I hereby authorize Katherine M. Robinson, R.N., to perform one of the following procedures associated with her study on how to help patients relax in the hospital:

   a. Back rub only
   b. Spoken relaxation guidance only
   c. Back rub and spoken relaxation guidance
   d. No treatment

2. The procedure or investigation listed in Paragraph 1 has been explained to me by Katherine M. Robinson, R.N.

3. (a) I understand that the procedures or investigations described in Paragraph 1 involve the following possible risks or discomforts:

   1. I may be embarassed by having my back exposed during the back rub, however, Ms. Robinson will close the door to my room during the procedure, arrange my bed linen and clothing in such as way as to minimize my exposure, and will draw the curtain around my bed if anyone else is in the room.

   2. It is possible that data gathered during the study may be accidentally and improperly released, resulting in an invasion of my privacy. However, Ms. Robinson will hold all data in strict confidence; the code number used by her when gathering the data will not be used in the final research report. There will be no way for a reader of the final report to determine that I was a subject in this study.

   3. I may be concerned that the kind of care I receive from the nurses in this hospital may be influenced by whether or not I am a subject in this study. Ms. Robinson has explained to me that the nurses who are working with me will not be told that I am or am not participating in a study.

(b) I understand that the procedures and investigations described in Paragraph 1 have the following potential benefits to myself and/or others:

It will help nurses understand more thoroughly some of the things they can do with patients in hospitals to help them become more relaxed.

(c) I understand that no medical service or compensation is provided to subjects by the university as a result of injury from participation in research.

4. An offer to answer all of my questions regarding the study has been made. If alternative procedures are more advantageous to me, they have been explained. I understand that I may terminate my participation in the study at any time.

_____ _____

Subject's Signature Date

CONSENT FOR REVIEW OF HOSPITAL CHART

I hereby give my permission for Katherine M. Robinson to review my chart and obtain necessary data for her research study.

I understand that any information she obtains will be held in the strictest confidence. I also understand that no reader of the final research report will be able to determine that I was a subject in this study.

_____

Signature

_____

Date

APPENDIX D

1 _____ 10

VISUAL ANALOGUE SCALE

APPENDIX E

DEMOGRAPHIC DATA

Subject Number: _____ Age: _____ Sex: M F

Diagnosis: _____

_____

_____

Hospital Day: _____

Date and Time of Treatment: _____

Treatment: Tactile Verbal Verbal + Tactile No Treatment

Score on Visual Analogue: _____

PRN Medications Taken:

Drug:	Dose:	Time:
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Comments: _____

_____

_____

_____

_____

_____

APPENDIX F

Verbal Relaxation Exercise
Focusing/Imaging

The content of the investigator's instruction to the subject is as follows: "Now, I want you to thing of the prettiest, most peaceful place you have ever been. . .(long pause). . .it may have been the mountains. . .or the sea shore. . .it is a place where you were very happy. . . perhaps you were with someone you loved. . .the prettiest, most peaceful place you've ever been. . .get a good picture of it in your mind's eye. . .you can see it now. . .I want you to keep thinking of this wonderful place, imagine you are there, while you relax. . ."

The investigator may find it necessary to repeat certain parts of the content from time to time, but does not vary it from that listed above.

APPENDIX G

Verbal Relaxation Exercise
Progressive Muscular Relaxation

The content of the investigator's instruction to the subject is as follows:

"Now I want you to relax your body. . .just let every muscle go limp. . .like a rag doll. . .the bed is holding you up. . .you do not have to do anything. . .your arms are heavy. . .you cannot hold them up, the bed must do it for you. . .your legs are totally relaxed."

The investigator observes the client for visual evidence of muscle relaxation and tension; the content of the exercise is then directed towards non-relaxed areas: "let your right arm go, it is totally limp. . ."

APPENDIX H

Tactile Relaxation Exercise

Backrub

Step I

Both hands are placed flat on the back of the client, with the heels of the investigator's hands positioned at the level of the subject's waist immediately lateral to the vertebral column. Using gradually increasing pressure, and utilizing both the fingers and the heels of her hands, the investigator begins to massage with a circular motion in ever widening circles, moving laterally from the vertebral column to the surface just superior to the iliac crests. The investigator has moved her hands only minimally in a superior direction at this point of the back rub. The investigator continues the same motion moving medially and returning to the point of origin. The hands are then moved superiorly. The motion remains circular, but without lateral movement. The hands ascend immediately lateral to the vertebral column.

Step II

When the hands are approximately lateral to the seventh cervical vertebral body, the investigator begins to move in a lateral direction massaging the shoulders and the area over the scapulae with ever widening circles and moderate

pressures. The investigator then begins to massage vigoursly with small circles moving laterally, medially, and inferiorly. The entire area of the back between the posterior axillary lines, the bony prominence of the seventh cervical vertebral body superiorly, and the level of the iliac crests inferiorly, is massaged during this sequence. Approximately 2/3 of the pressure is being applied with the heels of the hand and the remaining 1/3 with the fingers.

Step III

The investigator beginning at the level of the iliac crests, applies firm pressure with the heels of the hands, and begins to massage in small contiguous circles, moving alternately in a medial and lateral direction, ascending to a level approximately ten centimeters above the iliac crests. The same motion is repeated, moving inferiorly, to return the hands to the level of the illiac crests.

Step IV

The massage then continues with alternating medial and lateral movements of the hands in an inferior direction to the level of the gluteal crease and laterally to the posterior axillary lines. The investigator repeats this sequence, returning her hands to a point just lateral to the vertebrtal column and level with the iliac crests.

Step V

The investigator places both thumbs just lateral to the vertebral column and, with firm pressure, runs them repeatedly superiorly to the seventh cervical vertebral body, and inferiorly to the sacrum; after five or six repetitions of this movement, when in the superior position, the investigator continues the back rub, repeating steps two through five until termination.

For the purpose of this study, the duration of the back rub will be from five to seven minutes.

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